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Predicting recovery from whiplash injury in the primary care setting

Background

The effect of expectation of recovery on the recovery rate of whiplash patients in the primary care setting is not known.

Methods

Whiplash patients were assessed in a primary care setting within 1 week of their collision for their expectations of recovery and were re-examined 3 months later for recovery.

Results

Initial expectations of recovery predicted recovery. According to adjusted odds ratios, subjects who expected 'to get better slowly' had a recovery rate that was nearly 1.9 times that of subjects with poor recovery expectations. Subjects who expected 'to get better soon' had a recovery rate that was 2.6 times greater than either of those with poor recovery expectations.

Discussion

In the primary care setting, asking patients with whiplash about their expectations of recovery is a useful predictor of their outcome.

Keywords

accidents, traffic; whiplash injuries; prognosis

Population-based studies have shown that there is a robust association between expectations for recovery and actual recovery from whiplash-associated disorders, as assessed by several relevant types of measures.^{1,2} In a large, population-based cohort of over 6000 patients with whiplash in the acute stage, for example, the answer to the question 'Do you think that your injury will ...?' with response options 'get better soon; get better slowly; never get better; don't know' is prognostic. After adjusting for the effect of socio-demographic characteristics, post-crash symptoms and pain, prior health status and collision-related factors, those who expected to get better soon recovered over three times as quickly (hazard rate ratio = 3.62, 95% confidence interval 2.55–5.13) as those who expected that they would never get better.¹ Findings were similar for resolution of pain-related limitations and resolution of neck pain intensity.

The problem, however, is that the above-noted participants were from the entire population of applicants to an insurer for benefits, and this included those who never sought any medical attention otherwise. While patients attending primary care physicians would have been included in this sample, there is no data concerning the prognostic value of expectations in this subset. There remains the possibility that patients with whiplash who attend primary care physicians have a different prognosis from those who do not. It is important, therefore, to determine how useful it is to ask patients with whiplash about recovery expectations in the primary care setting.

Certainly, it has been shown in the primary care setting that patients with whiplash who expect 'never to get better' or 'don't know' have a much higher likelihood of developing at least one sign of central sensitisation 3 months later.³ Central sensitisation is a state in which nociceptive neurons and other aspects of the central nervous system can become sensitised by peripheral tissue damage or inflammation. This type of sensitisation has been suggested as a possible causal mechanism for chronic pain conditions. For patients with whiplash, those who expect to 'get better soon' will have negative central sensitisation testing.³ The extent to which this physical finding reflects recovery is not clear. Individuals seem to ascribe different meanings to the concept of 'recovery', as demonstrated by Beaton's studies of workers.⁴ Beaton's findings suggest that workers with musculoskeletal injuries variously conceive of 'recovery' as:

- involving a pain-free state (which she coined 'resolution')
- a state in which pain and symptoms are present but these individuals have adjusted their lives to accommodate and minimise these symptoms (which she coined 'readjustment')
- a state in which the pain and symptoms are 'redefined'; that is, these individuals have adapted themselves to living with the disorder (which she coined 'redefinition').

Consistent with this view, Ottosson et al.⁵ reported that although improvements in pain and physical functioning (measured by the SF-36) were highly associated with an answer of 'yes' to the question of 'Do you feel recovered?', persons with whiplash-associated disorders (WAD) did not necessarily require their health or pain level to return to baseline levels before considering themselves to have 'recovered'. Thus the term 'recovery' has a variety of different meanings

that go beyond a simplistic view of pain/symptom cessation and/or return to usual functioning. This has important implications for research where the goal is to examine recovery as an outcome in musculoskeletal disorders.

The use of straightforward, easily applied single-question approaches in the patient with acute whiplash is more likely to be of value to busy primary care practitioners than more complicated measures, and may help to predict which patients are likely to do well and which may not. To this end, it has been shown that the results of a single global question about recovery correlate well with more detailed questionnaires, such as the Whiplash Disability Questionnaire (WDQ).⁶ A single question regarding expectation and then a single question about recovery is thus ideal and valid in the primary care setting because it correlates with WDQ scores as an outcome.⁶ The reliability of this measure is less well known, however. Confirming the prognostic value of expectations in this way in the primary care setting will help aid in the rapid and effective assessment of which patients with whiplash can be expected to have a poor outcome. It is not yet known how patients who have a poor prognosis should be managed, or whether to use minimal therapy in those with a good prognosis. However, before studies can assist in determining whether knowledge of prognosis is helpful in the clinical setting and how it might influence treatment approaches, methods of predicting a prognosis must first be developed. The purpose of this study was to determine whether expectations in the acute phase after whiplash injury predicted recovery 3 months post-whiplash injury, adjusting for age, gender and initial whiplash disability scores.

Methods

This was a cohort study of patients with whiplash presenting consecutively within 7 days of their collision to a single walk-in primary care centre. Patients with a motor vehicle collision and suspected WAD were routinely referred from general practitioners (GPs) at the clinic, directly to the author, who was acting as a specialist consultant within that clinic. The specialist was an internist with an interest in rheumatology and chronic pain. It was the practice during the time of this consultant's presence at the clinic to refer all patients with acute whiplash to the consultant.

The author gathered data on patients referred over a 3-month period in 2009, the measurements being taken at the initial consultation as part of the routine measures provided to all patients (ie. as part of usual assessment). Prospective participants were further assessed for inclusion and exclusion criteria at the time of initial interview. Participants were examined to determine their WAD grade. According to the Quebec Task Force Classification,⁷ the grades of WAD are:

- Grade 1: complaints of neck pain, stiffness or tenderness only but no physical signs noted by the examining physician
 - Grade 2: complaints of neck pain and the examining physician finds decreased range of motion and point tenderness in the neck
 - Grade 3: complaints neck pain plus neurological signs such as decreased deep tendon reflexes, weakness and sensory deficits
 - Grade 4: complaints of neck pain and fracture or dislocation, or injury to the spinal cord.
- WAD grade 1 or 2 patients were included if they were seated in the interior of a car, truck, sports/utility vehicle or van in a collision (any of rear, frontal or side impact), had no loss of consciousness, were 18 years of age or over and presented within 7 days of their collision. Patients were excluded if they met any of the following criteria:
- had been told they had a fracture or neurological injury (ie. grade 3 or grade 4 WAD)
 - had objective neurological signs on examination (loss of reflexes, sensory loss – ie. grade 3 WAD)
 - had a previous whiplash injury or a recollection of prior spinal pain requiring treatment
 - had no fixed address or current contact information
 - were unable to communicate in English
 - had non-traumatic pain
 - were injured in a non-motor vehicle event
 - were admitted to hospital.

Ethical clearance was gained from the Health Ethics Research Board of the University of Alberta.

For convenience, the study was completed over a 3-month recruitment period. A total of 142 prospective participants were assessed and from these 21 were excluded (19 due to previous history, 2 due to loss of consciousness). Thus, 121 participants formed the cohort for study.

After an appropriate, standardised history and physical examination, participants completed a questionnaire containing a single question concerning expectation of recovery. This expectation was assessed by asking 'Do you think that your injury will...' with response options 'get better soon; get better slowly; never get better; don't know.' Participants then completed the WDQ. The WDQ is a modified version of the Neck Disability Index (NDI) consisting of 13 items designed to evaluate WAD, and has been validated, showing that the WDQ has excellent short- and medium-term reproducibility and responsiveness in a population seeking treatment for WAD.^{8,9} It is particularly useful as it includes an assessment of pain levels and psychological distress, both factors that predict recovery.¹⁰ The patients were prescribed a standardised treatment as appropriate; the physician was blinded to the WDQ and expectation questionnaires. Participants were asked to return for assessment in 3 months even if they improved or recovered, and were contacted by phone if necessary to complete the 3-month assessment. At 3 months post-injury, recovery was assessed with the question: 'Do you feel you have recovered from your injuries?' with responses of 'yes', 'no' or 'not sure'. This has been shown to be as useful as completing a disability questionnaire.⁶

Logistic regression was conducted with the independent variables of age, gender, expectation of recovery and initial WDQ score, as predictors of recovery. As the distribution of age and WDQ scores was normal, these variables were analysed as continuous variables. Dummy variables were created for each of the four categories of expectations. The odds ratios generated by logistic regression were then converted by setting a value of 1 for the group whose expectation was 'don't know' and then recalculating the other groups' odds ratios in relation to this group. A significance level of $P < 0.05$ was used. All analyses were conducted using IBM SPSS Statistics For Macintosh version 20 (Chicago, IL).

Results

Five participants did not return for follow-up and were removed from the study, leaving a final cohort with follow-up data for 116 of 121 eligible participants. Of the 116 participants, 52 were men and 64 were women. The mean age was $35.5 \pm$

12.2 years (range 18–69). The mean WDQ score within 7 days of injury was 60 (s.d. \pm 20, range 24–118).

At the time of the study, all participants were in a system of new legislation that places a cap of \$4000 on compensation for whiplash grades 1 and 2, with a standardised diagnostic treatment protocol applied to each participant. This system has been described elsewhere.¹¹ All participants had filed a claim with an insurance company to receive treatment benefits.

The initial responses to expectation of recovery were: get better soon (50/116); get better slowly (20/116); never get better (12/116); don't know (34/116). Following linear regression analyses with single variables, only expectation was significant in predicting recovery at 3 months. A multivariate analysis of variance (MANOVA) revealed that there was no significant difference in recovery rates between participants who responded that their initial expectation was 'never get better' or 'don't know'. However, participants who expected 'to get better slowly' had a recovery rate that was 1.9 times faster than those of the two groups with poor recovery expectations. Participants who expected 'to get better soon' had a recovery rate that was 2.6 times faster than those of the two groups with poor recovery expectations. Both of these rates were statistically significant in their difference from the groups with negative expectations ($P < 0.05$). The adjusted odds ratio for recovery (compared with the 'don't know' group) was 16.5 (95% CI: 5.2–52.7) for those who expected to 'get better soon' and 3.4 (95% CI: 1.1–10.8) for those who expected to 'get better slowly.' The odds ratio for those whose initial expectation was 'never get better' was the same as those who expected 'don't know' (Table 1).

Discussion

This study shows that the previously observed findings from population-based studies,^{1,2} that expectations of recovery predict self-reported recovery from whiplash injury, are also true in the primary care setting. When primary care physicians encounter acute whiplash injury, they can ask a single question concerning recovery expectations and be able to appreciate who is likely to have a poor outcome. Patients who respond 'get better soon' will recover 2.6 times as fast as those who respond 'never get better' or 'don't know,' or alternatively, are 2.6 times more likely to report recovery at 3 months. Those who respond 'get better slowly' are intermediate in their recovery rate.

The tools used in this study were chosen because of their simplicity, which facilitates application in busy primary care settings. What this study adds to the population-based study results^{1,2} is an affirmation that, indeed, expectation of recovery is important, but can now be shown not simply in those who are involved in collisions (as in the population-based studies where those who are injured may or may not attend a primary care physician), but specifically in those who attend primary care physicians.

A limitation of this study is that other potential confounders of outcome were not included in the analysis. However, previous studies^{1,2} have found that only age, gender, initial psychological distress, initial pain intensity and expectation to predict outcome. Indeed, the most recent study dedicated to developing a predictor model has reported that after examining a large group of variables, only age, number of days to reporting the collision, neck pain intensity, low back pain intensity, pain other than neck and back pain, headache before collision and recovery

expectations affect recovery.¹² This study also has a limited power to rule out the possibility of age, gender, or initial WDQ score predicting recovery 3 months later but there is a strong association between initial expectations of recovery and actual recovery. Although it is not likely to be the only prognostic factor,¹⁰ expectation of recovery seems to also be useful in predicting various outcomes,² suggesting that it is a belief that leads either to certain behaviours or is associated with other factors portending a poor outcome. It is not that the patient knows they have more pain and feels their outcome will be worse, but rather, expectation of recovery is a predictor of outcome independent of pain. There are other mechanisms that must be associated with the predictor effect of expectation. It has been suggested that coping style may be one mechanism.¹³ Those who have expectations of non-recovery or slow recovery are also likely to have a passive coping style, which may in turn lead to behaviours that indeed do lead to slower recovery.¹⁴ Further study is needed to determine what behaviours follow from expectations for patients with whiplash.

Further research will now be required to determine what measures to take, if any, for patients with whiplash who have poor prognoses. Do they require more therapy, more education, or does more intervention in fact worsen their outcome? Studies can be designed wherein the participants recruited are those with a poor prognoses, and are randomised to more intensive therapy versus a defined 'usual care'. As a corollary, this approach of prognosticating in the acute stage can also be used in studies to determine if those with a good prognosis need any therapy. That is, one could conduct a study in which participants with good prognoses are identified and randomised to receive either simple

Table 1. Self-reported recovery at 3 months after whiplash injury, according to initial expectations of recovery

Expectation after acute whiplash injury	Proportion reporting each expectation type	Proportion recovered at 3 months (% recovered)	Odds ratio of recovery at 3 months
Get better soon	50/116	45/50 (90%)	*16.5 (95% CI: 5.2–52.7)
Get better slowly	20/116	13/20 (65%)	*3.4 (95% CI: 1.1–10.8)
Never get better	12/116	4/12 (33%)	0.9 (95% CI: 0.2–3.7)
Don't know	34/116	12/34 (35%)	1

*Difference is statistically significant ($P < 0.05$), compared with group that expected 'don't know' regarding recovery. Odds ratios are adjusted for age, gender, WDQ scores

education and minimal intervention or some defined version of 'usual care'. That we can now predict prognosis is important, but it remains to be seen whether this will influence treatment choices.

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